

Minnesota County Geologic Atlases for Water Resource Management

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UNIVERSITY OF MINNESOTA

Minnesota Geological Survey



Ecological and Water Resources Division



County Geologic Atlases are a set of maps and reports that show the distribution of rock, sediment and groundwater in a county

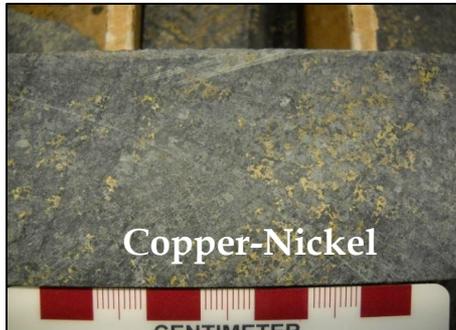
This information is

CRITICAL to

- Predict
- Plan
- Protect

Minnesota's natural resources including:

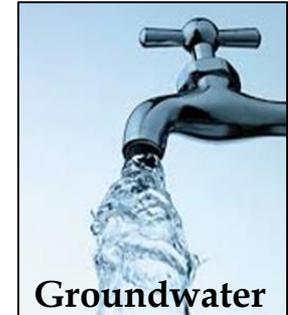
Minerals



Aggregate

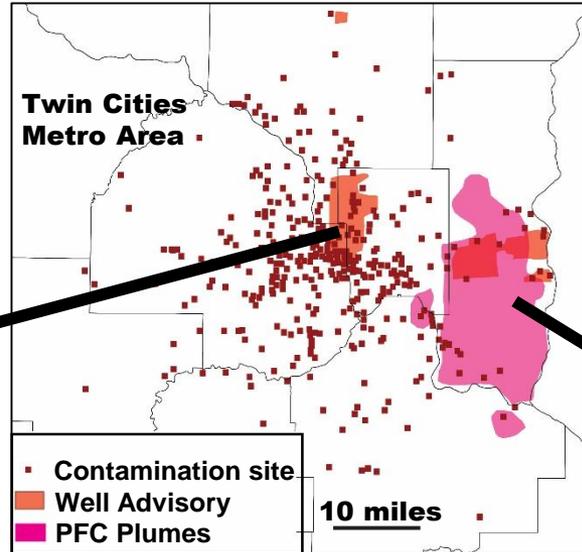


Water



Groundwater Quality Issues

Urban



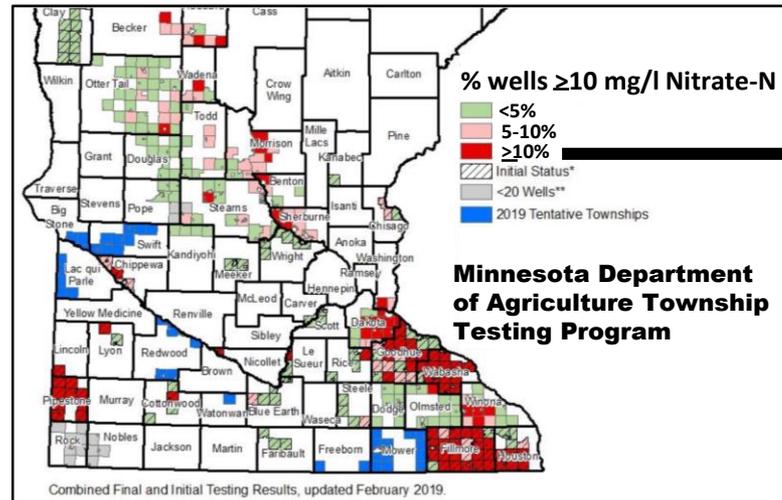
Twin Cities Army Ammunition Solvents (e.g. TCE)

- > \$150 million for remediation and ongoing treatment

PFC plume(s)

- ~140,000 citizens impacted
- tens of millions spent
- \$720 million acquired to provide clean drinking water

Rural



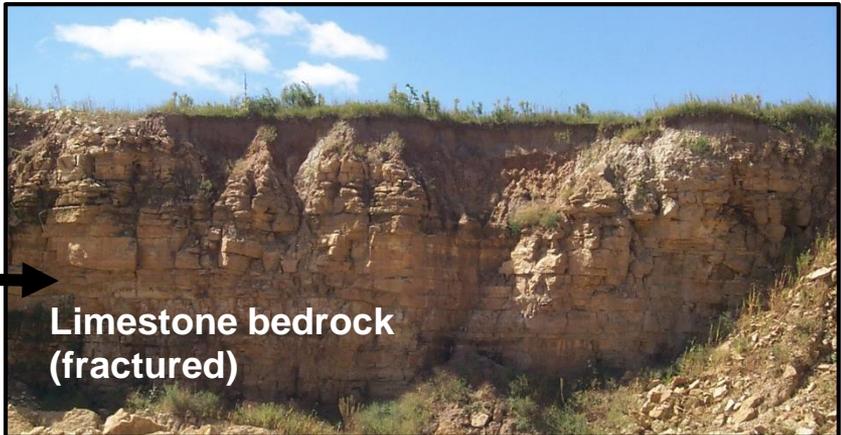
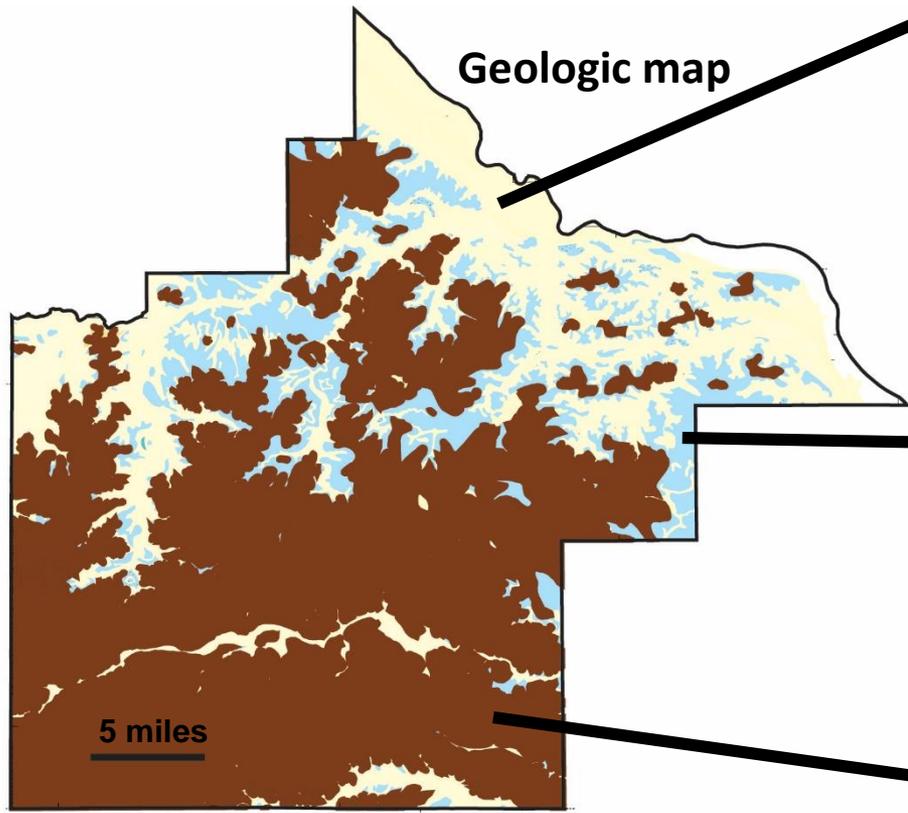
>10% private wells with nitrate above HRL

Combined Final and Initial Testing Results, updated February 2019

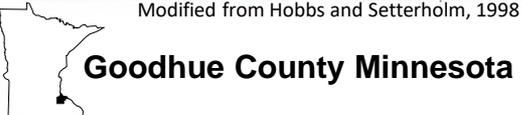
https://www.mda.state.mn.us/sites/default/files/inline-files/allctyresults_1.pdf

How do County Geologic Atlases help us understand water quality problems?

- Part A Mapping the sediment and bedrock

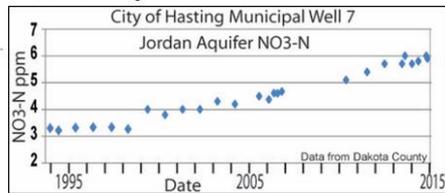
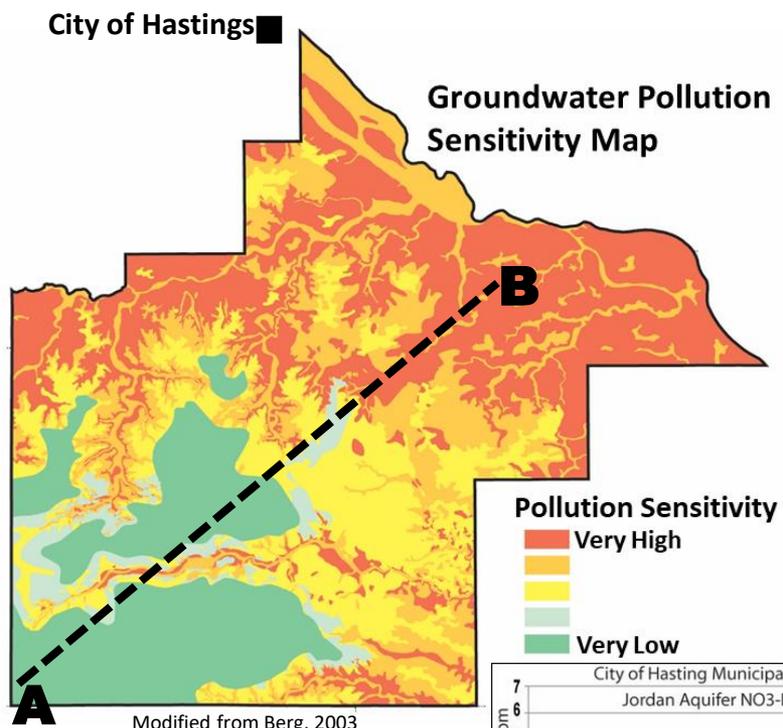
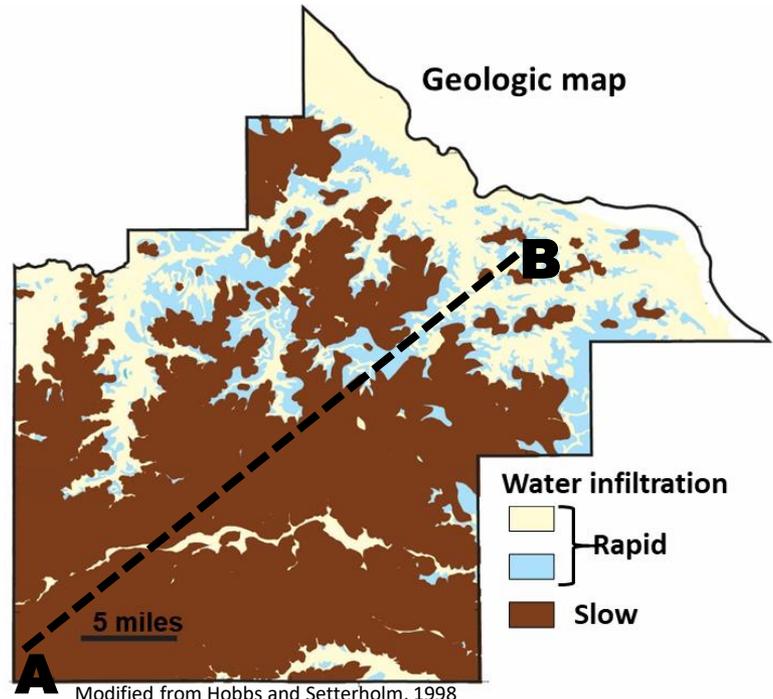


Modified from Hobbs and Setterholm, 1998

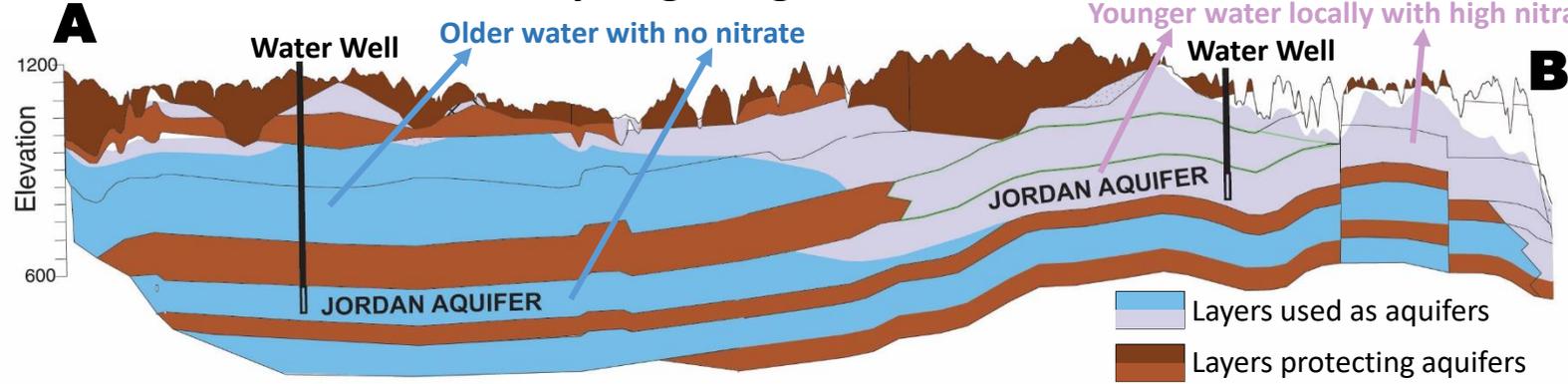


How do County Geologic Atlases help us understand water quality problems?

- Part B: Adding water-bearing properties

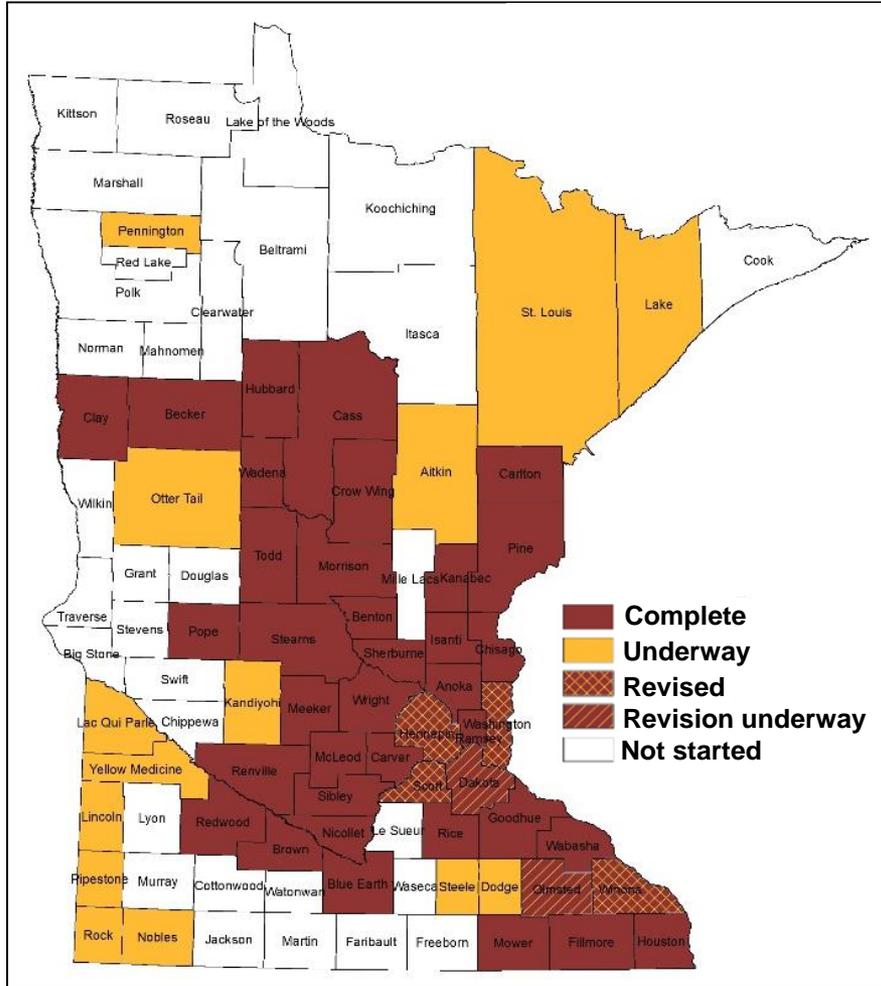


Hydrogeologic Cross Section

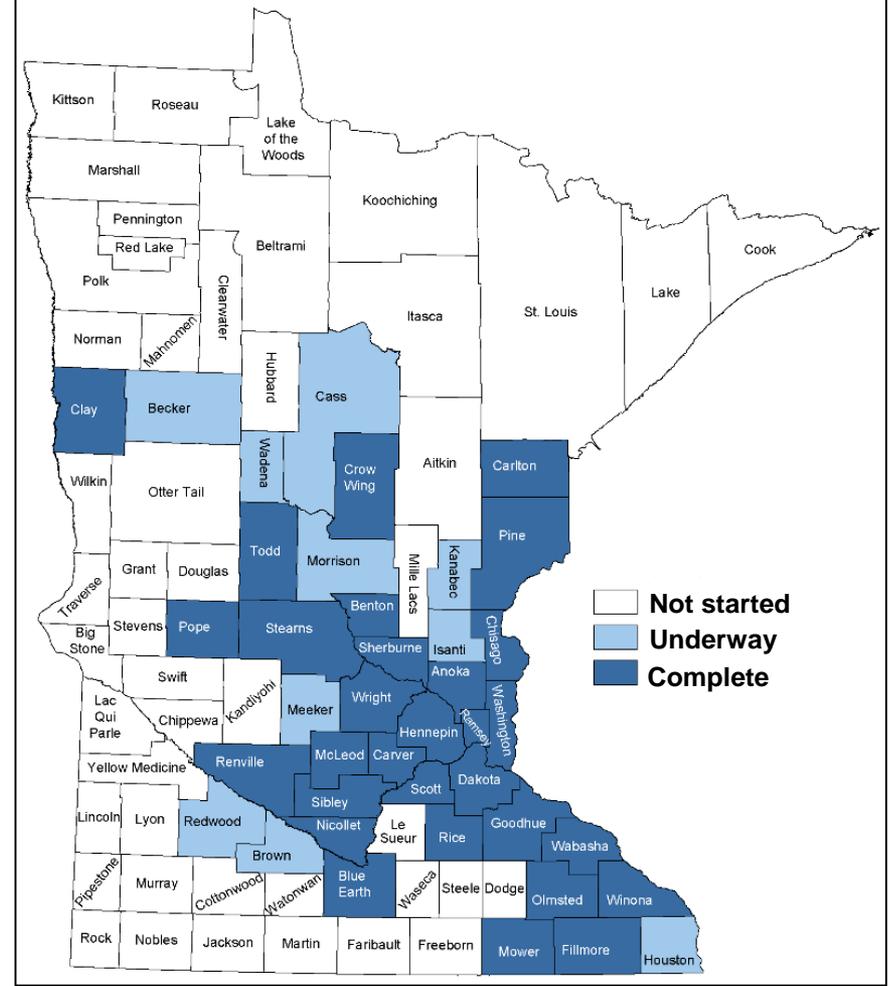


County Geologic Atlas Program: Progress

MGS Part A: Geology



MNDNR Part B: Hydrogeology



https://www.dnr.state.mn.us/waters/groundwater_section/mapping/status.html



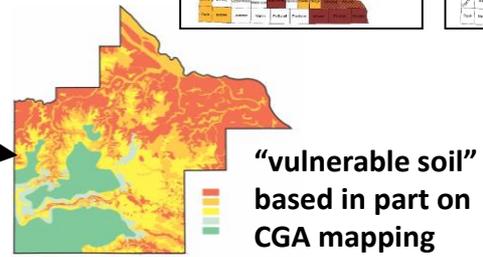
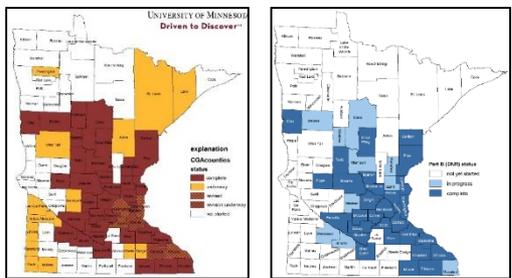
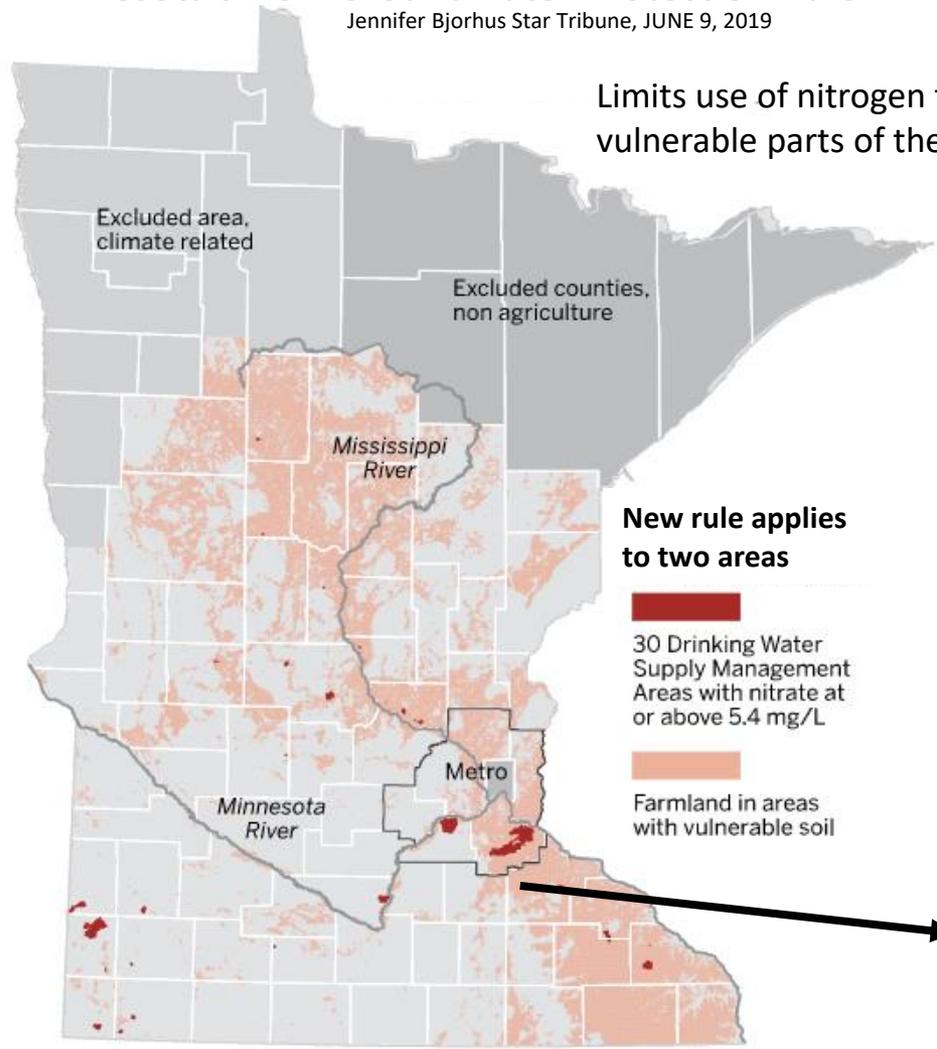
How do County Geologic Atlases help with water quality management?

- Example: MGS/DNR mapping is a key part of new nitrogen fertilizer rules

Minnesota's New Groundwater Protection Rule

Jennifer Bjorhus Star Tribune, JUNE 9, 2019

Limits use of nitrogen fertilizer in vulnerable parts of the state



Source: Minnesota Department of Agriculture RAY GRUMNEY • Star Tribune



County Geologic Atlas Program

Other water-related uses:

- Locating high-capacity wells
- Water budgets (e.g. predicting pumping impacts on streams and lakes)
- Monitoring water quality
- Siting landfills, human and animal waste storage.
- Geothermal projects
- Municipal water supply planning (aquifer capacity)

